Process Physics Validation: Algorithm-Related Issues

Dual Frequency Precipitation Radar

Detection:

- Light rain, snow
- Rain type (convective/stratiform)

Algorithm Physics:

- PIA Algorithm: Errors/Accuracy
  - Assessing and/or accounting for impacts of CLW, water vapor, DSD and assumed DSD models
- DSD retrieval:
  - DFR algorithm and DSD model for 3-D retrieval of rain and snow as f(regimes, temporal / spatial variability, precipitation rate)
- Z-R at light rain rates
- Sub-pixel variability
- Impact of external a priori regime ID
- Melting level ID, variability, extinction
- Hydrometeor ID and profile

Passive Microwave Radiometer

Detection:

- Snowfall detection thresholds and surface/atmospheric emission characteristics
- Rain no rain (especially light rain)
- Rain type (convective/stratiform)

Algorithm Physics:

- Single/bulk ice scattering vs. precipitation rates, types
- Melting layer extinction
- Water vapor, cloud water, and mixed phase impacts/models
- Impacts of a priori “regime” ID

Models:

- “Synthetic nature” of Cloud profile databases; empirical vs. numerical
- Coupled CRM/LSM physical inputs and associated parameterizations

Process Study Foci:

Australia: DSD/rain rate variability/profiles in sub-tropical/tropical ocean, coast, and land regimes; sub-tropics/tropics.

Brazil: Warm-cloud precipitation over land applied to passive microwave remote sensing ; Ice water path, lightning and passive microwave algorithms as function of regime and lifecycle

Canada: **Cold season focus**; snowfall properties and retrieval algorithms. Snowfall and precipitation processes in complex terrain (British Columbia, Ontario, Arctic)

Finland: **Cold season focus** on falling snow physics/algorithm development. Snowfall emission measurements/modeling.

France: Ice Microphysics parameterization toward improving MT-MADRAS microwave retrievals (over tropical land). Fine-scale rain fall variability and impacts on retrieval algorithms. African MCS lifecycle and coupling to retrieval algorithm physics

Germany: U. Bonn DSD spatial/temporal variability, cloud vs rain water using surface radiometry, precipitation profiling; DLR DSD/precipitation process and profiles.

Italy: Polarimetric retrievals of rain rate, DSD profile, and melting layer characteristics over a dense gauge network (Rome Observatory)

India: MT-driven T,RH and cloud liquid water profiles

Japan: DPR Pre-launch: DSD, Hydrometeor ID, T and RH profiles, melting layer models, gaseous attenuation, precipitation rates/contents, “synthesized nature” forward models.

Korea: **Cold season**/warm season regime variability of precipitation; forward model validation

Netherlands: Ice, snow, light precipitation and drizzle measurements at multiple frequencies and high resolution within integrated framework (CESAR) **[Cold season also]**

Taiwan: TIMREX/SoWMEX orographic precipitation processes in monsoon regimes

UK: Light precipitation over N. Latitude ocean

Algorithms: Making a difference

Facilitating communication between algorithm developers/managers and the GV science:

Is there enough communication of algorithm needs to GV scientists?

If we assume we know what the developers want, then how do we port results more directly to algorithms? That is, how do we “change a line of code”? Do we need a formal mechanism in place to do this, or are annual PMM Science Team meetings and/or other science conferences interaction enough?

Do we need access to the raw algorithm code (or structured flow chart) and a responsible party to accomplish this?